

MEMORANDUM

INTERMOUNTAIN POWER SERVICE CORPORATION

TO: S. Gale Chapman

PAGE 1 OF 3

FROM: Dennis K. Killian

DATE: October 8, 1997

SUBJECT: Recommendations on Pulverizer Reliability

As part of the ongoing effort by all departments to improve reliability of the pulverizers, we recommend the following:

- Place Variable Loading Skids (VLS) in service and in Auto/Master mode on both units. Promote rock rejection rather than grinding. Utilize minimal fuel and air biasing to maintain the mill performance when necessary. Establish a communication network regarding mill trouble-shooting and monitoring between all departments

Place All VLS In Service

Since July 18, 1996, all Unit 2 VLS have been in service. All Unit 1 VLS were taken out of service at that time for a comparison test. After 12 months of continuous monitoring, we found the following:

1. Improved Hydraulic Skid Reliability - With the installation of a high pressure filter and improved control valve, the skids have proven to be very reliable. With proper oil and filter changes, we have been operating the skids without any major concerns for the past 12 months.
2. Correct Spring Force - The VLS system allows us to provide optimal spring force for both six and seven mill operation. In AUTO/MASTER mode, the new pressure curve covers the two primary operation points:
 - 2100 psi at 70% feeder speed for Seven Mills Full Load
 - 2400 psi at 80% feeder speed for Six Mills Full Load
3. Excellent Tool For Mill Trouble Shooting - Mill rumbling (high vibration) is one of our major concerns. Rumbling causes broken loading rods, higher motor current, higher

PAGE 2 OF 3

IP12_013619

motor temperature and reduces mill service life and availability. Mill rumbling is caused by one or more of the following:

- Excessive spring loading force (70% of the problems)
- Sand on table (20% of the problems)
- Inadequate mechanical condition and feeder malfunction (10%)

VLS is a vital tool in identification and correction of these common causes of mill vibration.

Promote Rock Rejection

Increasing the spring pressure to eliminate rock rejection will cause far more problems than the small immediate benefit warrants. Increasing spring pressure will cause mill rumbling, loading rod failure, reduction of motor and gear box life and sand buildup on the table.

When skid pressure is increased to grind rocks that would otherwise be rejected, unstable unit pressure control often results within one to two days. We are currently preparing an approval package for installing hardware to remove the sand from the table. The goal should be to avoid increasing the hydraulic skid pressure whenever the rejects are substantially rock.

Utilize Fuel and Air Bias

Wherever possible, we recommend that minimal fuel and air biasing be the method of choice in maintaining required mill performance. In most cases where biases are necessary, they are needed only for a matter of hours and even then only in small amounts. As conditions change (coal quality, load, etc.) biases can usually be removed within hours.

Biasing the mills in this manner saves the mills from complications associated with hydraulic skid pressure manipulation. This approach also allows the hydraulic skids to continue responding to changes in load/feeder speed.

Establish Communications Network

Recent pulverizer problems have been more effectively addressed as Maintenance, Operations and Engineering have worked together to identify the root causes. This is largely possible because of the information provided by Operations in direct communication and detailed logs.

Engineering Services will continue to work with Operations on a daily basis in reviewing the logs and making corrections in hydraulic skid operation as necessary. In order to accurately identify problems associated with the skid, all setting changes

PAGE 3 OF 3

on the hydraulic loading skid including lockdown and manual operation require approval from the on-duty Operations Assistant Superintendent.

Please note your approval of these recommendations by signing below.

Approved by _____ Date _____

S. Gale Chapman
President & Chief Operations Officer

PTD/JKH:dh

cc: George Cross
Joe D. Hamblin

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